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ABSTRACT

This study involved the development and preliminary assessment of an intervention derived from contemporary social-cognitive theory to train academically underprepared college students in academic volitional control strategies, as implied by theory and research on volition and research on academic self-regulation. In this pre-post comparison design, 41 experimental subjects (community college students) participated in an investigator-designed intervention comprised of four, 70-minute group sessions, while 38 comparison subjects received regular remedial reading course content. Self-report measures of motivation, volition, and academic achievement were administered, and a posttreatment semi-structured interview was conducted. The experimental group demonstrated a significant improvement in academic self-monitoring. Compared to the control group, the experimental group gained more on all measures. Students gained awareness of the importance on an appropriate study environment and strategies for handling distractions from others. The implications of volitional strategy training for enhancing academic efforts are discussed. Nine tables present study findings. Appendixes contain three scales used in the cognitive-behavioral testing (the Academic Self-Monitoring Scale, the Academic Action Control Scale, and the Academic Self-Efficacy Scale), as well as an outline for introducing the Cognitive-Behavioral Intervention. (Author/SLD)

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Effects of a Cognitive-Behavioral Intervention On the Motivation, Volition, and Achievement Of Academically Underprepared College Students

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ABSTRACT

This study involved the development and preliminary assessment of an intervention derived from contemporary social-cognitive theory to train academically underprepared college students in academic volitional control strategies, as implied by theory and research on volition and research on academic self-regulation. In this pre-post comparison design, experimental subjects participated in an investigator-designed intervention comprised of four, 70-minute group sessions, while comparison subjects received regular remedial reading course content. Self-report measures of motivation, volition, and academic achievement were administered, and a posttreatment semi-structured interview was conducted. The experimental group demonstrated a significant improvement in academic self-monitoring. Compared to the comparison group, the experimental group gained more on all measures. Students gained awareness of the importance of an appropriate study environment and strategies for handling distractions from others. The implications of volitional strategy training for enhancing academic efforts are discussed.

INTRODUCTION

Academic underachievement at all educational levels has become a focus of national concern (National Commission on Excellence in Education, 1983). In particular, the past 30 years have witnessed an increase in the enrollment of academically underprepared college students, which is associated with the growth of community colleges and the prevalence of open admissions policies starting in the 1960's (Cross, 1976). When these students reach postsecondary institutions, they often experience continued difficulty learning. One possible explanation is that they may not have been exposed to opportunities to learn effective strategies for managing their learning-related efforts. They are unable to protect their intent to learn from competing intentions or other distractions (Kuhl, 1985). Thus, such students may be motivated to learn (that is, intend to learn), but since they do not know how to protect their intent to learn, they experience diminished motivation and future failure (Corno, 1986).

Recent theory and research on volition and academic self-regulation suggest that motivational and volitional difficulties may be overcome by training. Although no studies to date have been conducted to test this theoretical notion, both theoretical and empirical evidence from several perspectives has suggested the promise of social-cognitive approaches to the acquisition of volitional strategies. The research presented here involved the development and preliminary assessment of a specially designed intervention for academically underprepared college students and investigated its effects on

the cognitive, motivational and volitional components of academic self-regulation among this population.

Volitional Theory and Academic Self-Regulation

Volitional strategies have emerged as foci of interest in programs of research on academic self-regulation (Corno, 1989; Zimmerman, 1986; Zimmerman & Pons, 1986, 1988; Zimmerman & Schunk, 1989). These volitional components are viewed as higher-level meta-motivational rather than metacognitive, and function to direct and control concentration during school learning tasks. They are the control components of the metacognitive system, and differ from the organizational components of metacognition such as processes needed to structure or integrate material to be learned (Brown, 1978).

Recently, Corno (1986) has applied Julius Kuhl's (1981, 1984, 1985) theory and research on action control to classroom situations. The construct of action control is proposed to explain an individual's persistence on an intended course of action until a specified goal is reached, despite the presence of competing alternative action tendencies. Action control is conceptualized as a personality factor (action vs state orientation) in mature subjects and is comprised of "postdecisional, self-regulatory processes that energize the maintenance and enactment of intended actions" (Kuhl & Beckmann, 1985, p. 90). Thus, when confronted with a competing goal, action-oriented individuals are more likely to engage in change-oriented strategies, including choosing to initiate a new activity or trying to become reengaged in the current one.

State-oriented individuals, on the other hand, have a tendency to engage in maladaptive activies that interrupt their goal-directed efforts, such as dwelling on past failures.

In his research in West Germany with adult subjects, Kuhl uses a self-report instrument, the Action-Control Scale (ACS),to measure the action vs. state disposition in everyday activities such as buying a house, losing weight, and smoking cessation. Action orientation scores have been found to have moderate correlations with such personality constructs as test anxiety, self-consciousness, and future orientation, etc. Findings reveal that individuals with an action orientation, more than those with a state orientation, use less information in decision-making, limit their attention to appropriate features, and focus on incentive-related information when choosing between alternatives (Kuhl, 1985; Kuhl & Beckmann, 1985).

Kuhl's research identified six general volitional strategies that may be applied when individuals confront situations which threaten to disrupt their intended activities. Corno (1986, 1989) has argued that students need to apply similar volitional strategies to accomplish academic tasks when confronted with personal and environmental distractions. Table 1 presents the combined Kuhl/Corno classification scheme. As indicated, covert volitional control involves using <u>cognitive</u> strategies for selectively attending to, encoding and processing relevant information, as well as using <u>motivation</u> and <u>emotion</u> control strategies to promote an intended activity. Overt, behavioral volitional strategies involve managing the <u>task situation</u> and <u>social</u> aspects of academic endeavors.

Insert Table 1 about here

Social Cognitive Theory

Theoretical and empirical evidence from social-cognitive theories of human motivation and behavior (Bandura, 1986; Vygotsky, 1962) has contributed to the development of interventions directed at improving volitional or self-regulation strategies in clinical populations (Meichenbaum, 1972, 1977) and college students (Collins, Dansereau, Garland, Holley, & McDonald, 1981; Shapiro, 1988; Weinstein & Underwood, 1985). Central to this theoretical perspective are acknowledgments of: (1) the contribution of social interaction to human thought and behavior; and (2) the critical influence of cognitions (thoughts, beliefs, perceptions) on human motivation and behavior (Bandura, 1986). Self-regulation is viewed as a socially influenced and cognitively mediated process. According to this theoretical framework, the acquisition of self-regulation strategies derives from a gradual process in which knowledge about oneself is internalized through guided learning experiences involving teaching and modeling, the use of internal speech to guide behavior, self-observation, opportunities to receive feedback about one's performance, and practice (Bandura, 1986; Vygotsky, 1962). Examples of interventions derived from social-cognitive theories include:

cognitive-behavior modification programs (Meichenbaum, 1972, 1977), participant modeling instruction procedures (Shapiro, 1988), and learning strategies instruction (Collins, Dansereau, Garland, Holley, & McDonald, 1981; Dansereau, 1985; Dansereau, Collins, McDonald, Holley, Garland, Diekhoff, & Evans, 1979; Weinstein & Underwood, 1985).

Summary and Hypotheses

The purpose of the present research was to develop an intervention derived from contemporary social-cognitive theory for training academically underprepared college students in essential volitional strategies and to evaluate its effects on the cognitive, motivational and volitional components of academic self-regulation. It was expected that, following the intervention, experimental group subjects would have higher academic self-monitoring, higher academic action control, and higher academic self-efficacy than comparison group subjects. Further, this research investigated whether or not experimental subjects would increase academic achievement as measured by a reading achievement score.

METHOD

Subjects and Design

Seventy-nine students enrolled in a required remedial reading course at a community college in New York City participated in the study. In this pre-post comparison design, students were assigned randomly to experimental (N = 41) and comparison (N = 38) conditions.

The experimental group consisted of 14 males (34.1%) and 27 females (65.9%). The comparison group consisted of 12 males (31.6%) and 26 females (68.4%). Thus, the composition of the two groups did not differ significantly with respect to sex ($\underline{X}^2 = 0.06$, df = 1, $\underline{p} > .05$).

The mean age of participants in the experimental group was 22.7 (SD = 5.5), while that of the comparison group subjects was 23.3 (SD = 5.8). The two groups did not differ with respect to age ($\underline{t} = 0.47$, df = 77, $\underline{p} > .05$).

In the experimental group, 33 students (84.6%) had high school diplomas, and 6 (15.4%) had G.E.D.'s. Among the comparison group, 27 students (71.1%) had high school diplomas and 11 (28.9%) had G.E.D.'s. The groups did not differ significantly with respect to prior education $\underline{X}^2 = 1.95$, df = 1, $\underline{p} > .05$).

Among the 24 experimental subjects who had valid data for the "college admissions average," a measure computed only for those courses deemed by the university system to be college preparatory in nature (e.g., English, social studies, foreign language, science, and mathematics), the mean was 74.9 (SD = 7.0). Among the 25 comparison subjects with scores on this variable, the mean was 75.2 (SD = 7.5). Thus, the two groups did not differ significantly on this variable ($\underline{t} = 0.16$, df = 47, $\underline{p} > .05$). Mean scores on college admissions indicate that, overall, these students had not performed well in high school. Scores between 70-79 are roughly comparable to a "C" average.

The level of preparation of these students for college work is also indicated by the codes assigned to them indicating the remedial courses they have been required to take in reading and mathematics. Table 2 indicates the reading codes for students in the two groups. Note that the students were required to take as many as four remedial reading courses before they began to take college-level courses. The proportions of subjects in each of the reading placement code categories did not differ significantly ($\underline{X}^2 = 2.38$, df = 4, $\underline{p} > .05$).

Insert Table 2 about here

Table 3 presents the codes assigned to students in the experimental and comparison groups with respect to required remedial courses in mathematics. The majority of students in each group were also required to take at least one remedial mathematics course. The two groups did not differ significantly on this variable ($\underline{X}^2 = 3.30$, df = 1, $\underline{p} > .05$).

Insert Table 3 about here

In summary, students in the study had poor academic histories and significant skills deficits requiring remedial work. The experimental and comparison groups could be considered similar with respect to sex, age, prior education, and prior level of educational achievement.

Measures

The Academic Self-Monitoring (ASM) Scale, Academic Action Control (AAC) Scale, and Academic Self-Efficacy (ASE) Scale, were adapted for use in this study. The Academic Self-Monitoring (ASM) and Academic Self-Efficacy (ASE) scales were adapted from Howard (1989) and the Academic Action Control Scale (ASE) was adapted from the Action Control Scale (Kuhl, 1985). Specifically, the volitional aspect of academic self-regulation has both monitoring and control components, which were represented by academic self-monitoring and academic action control, respectively. Academic self-monitoring is the awareness of whether or not one is engaged in those internal covert cognitive activities required for school learning. Academic action control is the ability to engage in the cognitive, emotional, motivational, and environmental control behaviors required for school learning. Academic self-efficacy comprised the motivational component; consistent with the psychological construct labeled by Bandura (1977, 1981, 1982), academic self-efficacy refers to one's subjective expectations for success in academic tasks (Schunk, 1984, 1985). Academic achievement measured by a reading achievement score comprised the cognitive aspect.

Academic Self-Monitoring (ASM) Scale (Appendix A). The ASM Scale contained 11 items designed to assess one component of volition, academic self-monitoring. Students were instructed to indicate the frequency with which they engage in academic self-monitoring strategies in classroom and individual study situations (e.g., "When your teacher is teaching a lesson, do you compare the new information to something you know about already?") on a 5-point Likert scale, where 1 = never and 5 = usually. Cronbach's alpha internal consistency reliability coefficient for the scale was .79.

Academic Action Control (AAC) Scale (Appendix B). A 19-item rating scale adapted from Kuhl (1985) and Corno (1989) was used to assess the control component of volition, academic action control. Items were included to measure the areas of action-oriented performance response (AOP) (e.g., "When I understand a hard assignment, I congratulate myself about how well I did."), action-oriented response to failure (AOF) (e.g., "When I'm having difficulty writing a paper, I think about how important it is to finish school."), and action-oriented decision-making (AOD) (e.g., "When I have an assignment that I know is difficult, I finish it as soon as possible."). Students were asked to indicate the frequency with which they select action-oriented responses when faced with school-related situations on a 5-point Likert scale, where 1 = never and 5 = usually. Cronbach's alpha internal consistency reliability coefficient for the scale was .80.

Academic Self-Efficacy (ASE) Scale (Appendix C). Academic self-efficacy, a motivational component, was assessed using a 7-item rating scale adapted from Howard (1989). Students rated themselves on particular academic behaviors (e.g., "When an assignment is very difficult, how good are you at getting help?") using a 5-point Likert response format, with response options ranging from 1 = much below average to 5 = much better than average. Cronbach's alpha for the scale was .76.

Academic Achievement. Academic achievement was measured using the Descriptive Tests of Language Skills (DTLS) Reading Comprehension Test (Educational Testing Service, 1978), a timed assessment containing 45 multiple choice questions based on 15 short reading passages. Pretreatment scores were derived from tests administered at the time of initial college enrollment.

Semi-Structured Interview. In posttreatment interviews, 10 experimental students discussed their use of the strategies as well as and their perceptions of the intervention.

Treatment

The treatment (Appendix D) consisted of an investigator-designed structured intervention comprised of four 70-minute group sessions, with one session conducted during each week of a four-week period. The major constructs, rationale and model for the delivery of the treatment were derived from: (a) Kuhl's theory of volitional control, as adapted to educational settings by Corno; (b) contemporary social-cognitive theory; (c) empirical research in the design and implementation of self-regulation interventions for clinical populations and

college students; and (d) pilot work conducted with the community college student population.

The intervention provided instruction and practice in monitoring and controlling both external aspects (setting, task, and other people) and internal aspects (cognitive, motivational and emotional features) of students' learning environments. The techniques used were:

(1) Instructional presentations. These included exercises and activities designed to stimulate discussion about and elicit students' thoughts and feelings about volitional management and control of their academic efforts in class or while doing homework.

(2) Self-monitoring. Students' records of their study behavior were used to enhance their awareness of study behaviors.

(3) Positive self-speech. Students developed statements consisting of content a student could say to him/herself prior to, during, and following specific academic situations to cope with self-defeating thoughts and behaviors and to provide encouragement.

(4) Modeling and role-playing/behavioral rehearsal. Students role-played strategies for coping with self-defeating thoughts and behaviors, and received feedback from the investigator and their peers.

(5) Structured assignments. Structured assignments allowed students to demonstrate their ability to apply the new skills.

Procedure

Students in three randomly selected reading class sections completed pretreatment measures of ASM, AAC, and ASE. Experimental subjects participated in the investigator-designed intervention, while comparison subjects received the regular reading course content. Students in both the experimental and comparison groups were asked not to discuss the nature of their classes with anyone in the other group. Posttreatment measures of ASM, AAC, and ASE were administered to all students one week after the last session of the intervention. A regularly scheduled final examination in the reading course served as the posttest measure of academic achievement. Finally, 1 week after the posttreatment testing session, a semi-structured interview was conducted with a subsample of the experimental students.

RESULTS

Since preliminary analyses comparing the 3 classroom sections showed no significant differences due to class section on any measure, the classes were combined for data analysis purposes. Only those students were included in the analyses for whom both pretreatment and posttreatment scores were available.

Descriptive Statistics

Table 4 presents means, standard deviations, and numbers of cases for pre- and posttreatment scores on academic self-efficacy (ASE), academic self-monitoring (ASM), academic action control (AAC), and reading achievement (READING) for the combined treatment and comparison groups. Table 5 presents the intercorrelations among pretreatment measures for the total sample, and Table 6 presents the intercorrelations among

posttreatment measures for the total sample. In each case internal consistency reliability coefficients for the ASE, ASM, and AAC scales are indicated. All intercorrelations were moderate at both pretreatment and posttreatment, suggesting that the scales measured separate but related constructs. Reliability coefficients ranged from .69 to .82 for the variables measured, indicating acceptable reliability.

Insert Table 4 about here

Insert Table 5 about here

Insert Table 6 about here

Preliminary Analyses

Table 7 presents results of independent sample t-tests comparing the treatment and comparison groups on pretreatment scores on the variables of interest. These t-tests indicated no significant differences between the groups with respect to pretreatment mean scores on any variable. Table 7 also presents posttreatment means and standard deviations on the dependent

variables by group, independent sample t-tests for the significance of group differences at posttreatment, and F_{MAX} tests for the significance of differences between sample variances at posttreatment. These tests indicated no significant ($p > .05$) differences in unadjusted posttreatment means and no significant differences between the posttreatment sample variances.

Insert Table 7 about here

Table 8 presents Pearson product-moment correlations between pre- and posttreatment measures on each of the criterion variables, for the total sample and for each of the two groups separately. The table also presents unstandardized regression coefficients for the post- on pre- regressions for each variable in each of the two groups, and F-tests for the significance of aptitude-treatment interactions. Correlations between pre- and posttreatment scores for the total sample ranged between .54 and .68 for the four variables, indicating a moderate linear relationship for each variable. None of the F-tests for aptitude-treatment interactions were significant, suggesting that the assumption of homogeneity of regression was tenable for each variable.

Insert Table 8 about here

Test for Treatment Group Differences

Given the moderate linear relationship between pre- and posttreatment measures, the lack of significant pretreatment differences, the homogeneity of variance of posttreatment scores, and the lack of significant differences on the *F*-test for ATI, analyses of covariance (ANCOVAs) of posttreatment scores on these variables, controlling for pretreatment scores, were calculated for the four variables of interest. These analyses indicated no significant overall treatment effects.

Pretreatment to Posttreatment Changes

Scale scores. In each group separately, correlated sample *t*-tests were conducted to assess the significance of pretreatment to posttreatment changes on the four scale scores measuring ASE, ASM, AAC, and reading achievement. As shown in Table 9, the results of these *t*-tests indicated that a significant ($p < .05$) improvement occurred in the academic self-monitoring scores of the treatment group. The comparison group also demonstrated a mean improvement in academic self-monitoring, but the improvement was not significant. Both the treatment and comparison groups demonstrated significant increases in reading achievement.

Insert Table 9 about here

Pretreatment to posttreatment gains were analyzed by comparing the magnitude of the observed pre- to posttreatment change with the posttreatment standard deviation of the comparison group showed that the experimental group demonstrated mean gains on all measures. The mean gain on ASM was .48 standard deviations, while that on reading achievement .76 standard deviations. The comparison group demonstrated mean gains on only two of the four measures. The mean gain on ASM within the comparison group was just .10 standard deviations, and that on reading achievement .54 standard deviations. Scores decreased on the other two measures (ASE and AAC).

Individual items. In each group, pretreatment responses to each of the individual items of the ASE, ASM, and AAC scales were crosstabulated by the corresponding posttreatment responses. The number of respondents demonstrating more favorable self-appraisals at posttreatment than at pretreatment was noted, as was the number whose self-appraisals were less favorable at posttreatment. A McNemar test for the significance of pretreatment to posttreatment changes was performed on each item in each group, in order to determine whether there were specific areas in which change occurred. These tests indicated that respondents in the experimental group evaluated themselves significantly more positively on three items at posttreatment than at pretreatment. These 3 items are: "comparing new information in lessons to what you know," "planning steps required to complete an assignment," and "thinking about whether you have a general understanding of the material." No significant changes were observed in the comparison group.

Posttreatment Interviews

One week after the posttesting session was conducted, a subsample of students described their perceptions of the intervention in individual interviews. During these interviews, several students reported that participation in the intervention represented the first time in their academic careers they had given thought to the process of studying. For example, JB stated:

> I never really realized how I was studying or even thought about how I was studying, you know, I would just study. Or where I was studying, how much noise, . . so it helped me a lot.

JB also indicated that her new awareness of "how" to study resulted in specific changes in her study behavior. For example:

> Makin' sure I'm studying and enough light, not a lot of noise, you know. Sayin' no to my friends, stuff like that.

Other students indicated that, prior to the intervention, they had been aware that there were relatively more and less efficient methods of studying, but that they had never made it a point to put these methods into practice. For example, MS said:

> It's like, you know the habits and everything, you know them, but you just, you're not conscious of them, and you're not putting them into practice or anything, but you just know them, but you're not conscious of them. So you're not . . . using them as a tool or anything.

Of the ten students interviewed, eight spontaneously mentioned that the most important changes resulting from the

intervention were concerned with gaining control over the study environment. For example, DM said:

> When I study in my room, and there's my street, there's like a lot of traffic, I hear the horns, I could hear the people next door, their TV, cause I have a window here and it's like everybody's television, their, what's going on in their house, I could hear. I could hear my TV, my phone is always ringing. So what I do is I just close the windows, I shut my phone off, I close all the doors so I can't hear the TV. So it works, it's worked out a little bit better. Or I just moved to another room that's more quiet. Like, if no one's home, I'll just sit in the kitchen. It's more quiet there. Than all that noise up front.

Another example of the concrete nature of the changes brought about by the intervention is that five of the ten students interviewed stated that they had made changes in handling distractions from siblings, friends, and spouses. RM stated:

> One of the most helpful things was to remind myself how to deal with certain situations. For example, ... like I said before, I have told my friends that I am in school, but one thing is doing that, and I did that without thinking in the future, you know. And now I have the fresh idea in my mind why I did that, you know, so I can now have an answer more easily than before, you know. Probably if somebody calls, maybe to invite me to a concert. . . . I can be very clear, I mean, not being rude or anything like that, but I can be very clear, I can get to the point and try just to switch that situation to something different, to, for exmaple, to invite them to do something the next day as an alternative.

Another aspect of the intervention students commented on was training in the use of self-coaching strategies. During posttreatment interviews, six of the ten students made

spontaneous reference to the work done on private speech (self-coaching) as a way of "disciplining" themselves to study. JS indicated that instruction in self-coaching was the most important part of the intervention:

> I learned to tell myself that my education is more important than anything else. . . So you know that you have this goal that you have to reach, and you know that. . . unless you try you won't get it. There are times when. . . I'm thinking about something else, or I don't feel good, [or] I don't feel like studying at all, but I know that I have to, because that time is precious. I say, if you miss it, that's it, it won't come back, and I say [to myself], let's go back [and study]. I know that I have to do it, and I learned to tell myself, this is important, [and I'm] going to do it now.

LW indicated that she learned to coach herself by reminding herself of the long-term benefits to be gained by studying now:

> I need to do better. . . to look for the long term instead of the short term, where I want to be . . . a few years from now. . . . I have been in school before. This is my second opportunity. I want to make the best of my second chance. I'm more mature now, so I look at it with a more mature viewpoint. I just keep telling myself, you're doing this for your best benefit in the long run. . . . Being out in the work force, not having a college degree, you gotta stay at a certain place, and I don't want to stay there. I want to go above. . . thinking of my goals and self-coaching myself to go on for what I really want in the future.

In general, students reported that they enjoyed the assignment to develop several "relevant" self-coaching statements, and they created many unique statements that had meaning for them. Students wrote their statements on index

cards that they were encouraged to keep readily available. One student said he planned to put his card in his wallet. A few of these statements are listed below:

> If I don't get my work done now, I'll end up a bum.
>
> I want to go to Florida in June, and I can do it only if I pass all my courses and get good grades.
>
> If my friend can do it, I can, too.
>
> Being a good student now means being an excellent teacher later on.
>
> I have to study hard so I can be a model mother to my daughter.
>
> I have to prepare for exams way in advance to avoid being anxious.

On balance, student comments suggested that the academic cognitive-behavioral intervention was perceived as useful by students, particularly with respect to managing the study environment and developing the capability to handle potential distractions.

DISCUSSION

The results of this study show that students generally perceived the academic cognitive-behavioral intervention as helpful, particularly in making them aware of the importance of

an appropriate study environment and providing them with useful strategies for handling potential distractions. On the other hand, the intervention was not clearly more effective than the comparison condition in improving academic self-efficacy, academic self-monitoring, academic action control, or reading achievement. Analyses of covariance of posttreatment scores on these variables, controlling for pretreatment scores, were nonsignificant. Correlated sample *t*-tests indicated that the experimental group demonstrated a significant improvement on ASM, while the comparison group did not. Thus, there is evidence that the treatment may had had some impact in this area. Finally, analysis of individual items of the academic self-monitoring scale indicated that respondents evaluated themselves more positively following the intervention on, "comparing new information in lessons to what you know," "planning steps required to complete an assignment," and "thinking about whether you have a general understanding of the material." No significant changes were observed in the comparison group.

Perhaps the most interesting finding is the contrast between the reports of participants which indicate that the academic cognitive-behavioral intervention was both enjoyable and useful, and the lack of clear evidence indicating the effectiveness of the treatment in improving dependent measures of academic self-efficacy, academic self-monitoring, and academic action control. Students' reports suggested that the focus of the intervention was sound. Moreover, psychometric data indicated

that the ASM, AAC, and ASE Scales were in fact reasonably reliable measures of three separate, but related constructs. However, there may have been a degree of mismatch between the content of the intervention, the specific needs of the population studied, and the measurement tools applied.

It was anticipated that the concrete areas of environmental control would be the most amenable to training and indeed they were. The intervention was particularly helpful in increasing students' awareness of the importance of an appropriate study environment and providing useful strategies for handling potential distractions from others. Thus, students took the first steps in acquiring academic volitional control: they learned how to get to an effective study situation. As anticipated, they did learn to use overt, behavioral environmental strategies after a short period of training.

It may well be that behavioral change with respect to setting and social control occurs before cognitive change. Corno suggested that behavior change is, in theory, easier to make than cognitive change (Corno, 1989, 1980). Further, it will be recalled that students' immediate need for assistance with the fundamental aspects of environmental control (peer, task, and setting control) was recognized by scheduling instruction in these areas during the first two sessions, following Corno's (1989) hypothesis concerning ease of acquisition. There may be a primacy effect for this information.

A further possibility is that there may be a minimum ability level necessary for the inculcation of the covert strategies in a short-duration study (which was not present in this sample). Kuhl and Kraska (1989) argue that cognitive ability and volitional facility are interactive, and present some evidence that volitional control increases with age and related cognitive shifts in German and Mexican children. It may be necessary to assure that students have acquired skills in the most concrete, behavioral aspects of peer, setting, and task control before focussing on more complex covert processing. Future research must address the interaction between the cognitive deficits that characterized this population, and their volitional and motivational deficiencies.

However, it was also expected that students would go on from these concrete areas to achieve gains in internal covert areas of volitional control. There were some indications that students may have begun the process of acquiring these strategies. Pre- to posttreatment gains on three items of the ASM Scale suggest that students exposed to the treatment became significantly more likely to plan the steps required to complete a task before beginning work on it, compare new information being taught to things they already know, and consider their general understanding of an area while doing homework. One is struck by the global nature of these strategies. It may be argued that by the end of the intervention these students were just beginning to be aware of academic self-monitoring strategies of the most general type. Gains were not made in the

areas of outlining, prioritizing information, or focussing on specific sections of assignments in a sequential order. This suggests that students may not have learned the kinds of specific activities they must employ during an assignment to assess their level of understanding on a continual basis.

Expected gains in internal covert processing control were not found. The intervention may have been too brief to achieve these gains. It should be kept in mind that action control is defined in a general way by Kuhl as an adult, dispositional variable. Social-cognitive theory suggests that the acquisition and use of specific cognitive-behavioral strategies derives from a gradual process of internalizing knowledge about oneself. For this reason, one's characteristic mode of action control is likely to be highly resistant to change. Further training, more time to practice and receive feedback, and greater opportunity to apply these strategies in actual study situations may be required if students are to become aware of self-monitoring strategies at the micro level, and to use these strategies while studying.

It also appears that the behaviors in which the most dramatic gains were reported were not assessed adequately. There are qualitative differences between the strategies mentioned by the students spontaneously and the strategies assessed by the AAC Scale. An item on the AAC Scale falling into the category of task control such as, "When I'm falling behind in my work for a course, I schedule time to catch up," implies a higher level of planning ability than doing an

assignment as quickly as possible before leaving school. Furthermore, one has the impression that these students are still struggling with the effective completion of one assignment. They are not yet ready to deal with issues such as scheduling and prioritizing multiple assignments. The measures used in the study did not emphasize the concrete aspects of controlling the setting and handling potential distractions from others. Nor were covert cognitive processing control strategies taught in the intervention. For example, although students reported that instruction and exercises in internal speech (self-coaching) was both interesting and useful, no significant improvements were observed on the AAC Scale. It may be that their specific student-developed statements were more personally meaningful (e.g., "I have to study hard so I can be a model mother to my daughter.") and the general items on the AAC Scale were less salient ("When I want to stop work on a homework assignment that needs to be done, I remind myself that it is important to keep up with each lesson."). Students may benefit more from instruction in content aimed at mastery of specific overt and covert volitional strategies, rather than from the more general "reattribution" training types of effort statements.

Student feedback proved to be an invaluable source of data relevant to the most helpful aspects of the intervention and the areas found to be most problematic. Future research in this area should include and emphasize the importance of such data. In addition, there is a need to establish a link between

self-report and actual behavior. Verbal reports need to be translated into behavioral measures.

A special challenge for future investigation will be operationalizing the strategies to reflect the volitional issues of this population's level of academic ability and preparedness. In particular, incorporating the social and cultural context within which academic performance is embedded is a critical component in understanding achievement strivingings. (Cole & Scribner, 1974; Rogoff & Lave, 1984). This study suggests a need to explore students' world views regarding achievement and success, the relationship between their behavior and outcomes, their goal and aspiration systems, their self-views, and their perceptions regarding the opportunity structure.

Institutional constraints precluded the possibility of more frequent training in these volitional strategies. Interventions of this type may need to be longer in duration, more intense, and perhaps incorporated on a regular basis into the curriculum (see Pressley, Borkowski, & O'Sullivan, 1984, for related research on cognitive strategy training). In this regard, it is noteworthy that participants in the intervention did not gain less in reading than their comparison group, despite the fact that they had 280 minutes less of reading instruction. Both groups demonstrated significant gains in reading achievement from pre- to posttreatment, and the magnitude of the mean gains in the two groups did not differ significantly. It may be that some aspect of the intervention improved the study efficiency of the treatment group students, so that they could achieve gains comparable to those of comparison group students with relatively less instruction.

Given the breadth of the domain of academic volitional control, it seems reasonable to suggest that teacher training programs incorporate the teaching of such process skills, rather than focussing narrowly on instruction in content alone. The results of this study suggest that the academically underprepared students in the population studied here tend also to be deficient not only with respect to their achievement levels in reading and mathematics, but also in the area of academic volitional control. These processing strategies are very important to these students. Perhaps they should be taught along with basic reading and mathematics skills at all levels. In fact, it may be advisable to incorporate interventions of this type into the curricula of such students on a regular basis (see Pressley, Borkowski, & O'Sullivan, 1984).

In particular, the gains reported by students in the areas of task, setting, and peer control emphasize the importance of instruction in this area for the academically underprepared population studied. It may be argued that such students have not had the opportunity to be exposed to the same range of career and life options that traditional college-level students have grown up with. Further, the home environments of some students may not foster the development of long-range planning skills, and the students often do not have available to them parental role models who will tell them that it is important to have a good study environment. The intervention provided an opportunity for students to verbalize their present study habits and develop personalized ways of enhancing their study effectiveness. This group in particular is in need of instruction in strategies that can maximize the effectiveness of their study time.

It would appear that deficits of this population in the areas of academic self-monitoring and academic action control may go a long way toward accounting for the frustration experienced by teachers and students alike when their joint efforts are unsuccessful. These deficits explain how teachers can be correct in saying, "I taught it," and students correct in saying, "I studied it," even though the students are unable to demonstrate gains in learning on achievement tests. It is not that the students lack will or effort. Their tenacious efforts to remain in school suggest otherwise. Rather, they lack volition--the action control strategies needed to benefit from their prodigious efforts.

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Table 1

Categories of Volitional Control and Specific Volitional Control Strategies (Kuhl/Corno)

I. Covert Processes of Self-Control
A. Control of Cognition
1. Attention Control*
2. Encoding Control*
3. Information Processing Control*
B. Emotion Control*
C. Motivation Control*
1. Incentive Escalation*
2. Attribution
3. Self-Instruction
II. Overt Processes of Self-Control Environmental Control*
A. Control of the Task Situation
1. Task Control
2. Setting Control
B. Control of Others in the Task Setting
1. Peer Control
2. Teacher Control

*Volitional Strategies identified by Kuhl (1985). Kuhl equates motivation control with incentive escalation, and does not distinguish the subprocesses of environmental control.

Table 2

Reading Placement Codes of Experimental and Comparison Group Subjects

Reading Placement		Group			
		Experimental		Comparison	
Code		N	%	N	%
1:	4 courses required	7	17.1	10	26.3
2:	3 courses required	11	26.8	10	26.3
3:	2 courses required	14	34.1	10	26.3
4:	1 course required	9	22.0	7	18.4
5,6:	No remedial course required	0	0.0	1	2.6
		41	100.0	38	100.0

Table 3

Mathematics Placement Codes of Experimental and Comparison Group Subjects

Mathematics Placement		Group			
		Experimental		Comparison	
Code		N	%	N	%
1:	2 remedial courses	18	43.9	15	39.5
2:	1 remedial course	15	36.6	9	23.7
3:	no remedial courses	8	19.5	14	36.8
		41	100.0	38	100.0

Table 4

Descriptive Statistics on ASE[a], ASM[b], AAC[c], and Reading--Total Sample

Variable	N[d]	Minimum	Maximum	Mean	SD
Pre					
ASE	63	15	32	23.4	3.7
ASM	61	22	48	40.1	6.3
AAC	59	53	91	72.4	9.1
READING	70	1	20	5.2	3.7
Post					
ASE	63	13	33	23.6	4.2
ASM	61	29	51	41.6	5.3
AAC	59	53	89	72.3	9.1
READING	70	1	19	8.3	4.2

[a]Academic Self-Efficacy.

[b]Academic Self-Monitoring.

[c]Academic Action Control.

[d]Number of cases reported for each variable is that for which both pre- and posttreatment data are available.

Table 5

Intercorrelations[a] among Pretreatment Measures on ASE[b], ASM[c], AAC[d] and Reading--Total Sample

	ASE	ASM	AAC	READ
ASE	.76***	.46***	.31**	.29**
	(63)[e]	(61)	(59)	(63)
ASM		.79***	.37***	.26*
		(61)	(59)	(61)
AAC			.80***	.05
			(59)	(59)
READING				--

[a]Internal consistency reliability coefficients for each test are presented in diagonal of correlation matrix.

[b]Academic Self-Efficacy.

[c]Academic Self-Monitoring.

[d]Academic Action Control.

[e]Number of cases on which each correlation is based is presented in parentheses below the correlation.

*$p < .05$.

**$p < .01$.

***$p < .001$.

Table 6

Intercorrelations[a] among Posttreatment Measures on ASE[b], ASM[c], AAC[d] and Reading--Total Sample

	ASE	ASM	AAC	READ
ASE	.79***	.29*	.34**	-.07
	(63)[e]	(61)	(59)	(63)
ASM		.69***	.62***	.21
		(61)	(59)	(61)
AAC			.82***	-.01
			(59)	(59)
READING				--

[a]Internal consistency reliability coefficients for each test are presented in diagonal of correlation matrix.

[b]Academic Self-Efficacy.

[c]Academic Self-Monitoring.

[d]Academic Action Control.

[e]Number of cases on which each correlation is based is presented in parentheses below the correlation.

*$p < .05$.

**$p < .01$.

***$p < .001$.

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Table 7

Pretreatment and Posttreatment Means and Standard Deviations on Dependent Variables by Group

	Group												
	Treatment					Comparison							
	N[a]	Mean		SD		N[a]	Mean		SD		t[b]		
Variable		Pre	Post	Pre	Post		Pre	Post	Pre	Post	Pre	Post	F[c]
ASE[d]	36	22.7	23.2	3.6	4.2	27	24.4	24.1	3.6	4.3	1.80	0.83	1.03
ASM[e]	35	38.8	41.2	6.5	5.5	26	41.8	[illegible].3	5.6	5.0	1.84	0.81	0.92
AAC[f]	33	71.9	73.2	9.2	9.1	26	72.9	71.2	9.1	9.0	0.79	0.84	1.05
READ[g]	39	5.3	8.8	3.1	3.9	31	5.1	7.6	4.4	4.6	0.22	1.19	1.45

[a]Number of cases is number for which both pre- and posttreatment scores are available.

[b]Independent sample t-test for significance of difference between group means.

[c]F_{MAX} test for homogeneity of variance of posttreatment scores.

[d]Academic Self-Efficacy.

[e]Academic Self-Monitoring.

[f]Academic Action Control.

[g]Reading Achievement Scaled Score.

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Table 8

Pearson Correlations Between Pretreatment and Corresponding Posttreatment Scores

	Group									
	Total Sample			Treatment Group			Comparison Group			
Variable	N	r	b[a]	N	r	b[a]	N	r	b[a]	F[b]
ASE[c]	63	.55	.64	36	.51	.60	27	.58	.69	0.14
ASM[d]	61	.54	.46	35	.45	.38	26	.68	.61	1.34
AAC[e]	59	.68	.69	33	.55	.54	26	.88	.87	3.04
READ[f]	70	.57	.64	39	.51	.64	31	.62	.65	0.01

[a]Unstandardized regression coefficient (posttreatment on pretreatment regression).

[b]F-test for treatment by covariate interaction.

[c]Academic Self-Efficacy.

[d]Academic Self-Monitoring.

[e]Academic Action Control.

[f]Reading Achievement Scaled Score.

Table 9

Pretreatment to Posttreatment Gains and Correlated Sample t-tests for the Significance of Gains on Scale Scores

		Treatment Group					
		Pretreatment		Posttreatment			
Variable	N	Mean	SD	Mean	SD	Gain	t[a]
ASE[b]	36	22.7	3.6	23.2	4.2	+0.5	0.73
ASM[c]	35	38.8	6.5	41.2	5.5	+2.4	2.21*
AAC[d]	33	71.9	9.2	73.2	9.1	+1.3	0.82
READ[e]	39	5.3	3.1	8.8	3.9	+3.5	6.30***
		Comparison Group					
ASE[b]	27	24.4	3.6	24.1	4.3	-0.3	-0.42
ASM[c]	26	41.8	5.6	42.3	5.0	+0.5	0.50
AAC[d]	26	72.9	9.1	71.2	9.0	-1.7	-2.02
READ[e]	31	5.1	4.4	7.6	4.6	+2.5	3.56***

[a]Correlated sample t-test.

[b]Academic Self-Efficacy.

[c]Academic Self-Monitoring.

[d]Academic Action Control.

[e]Reading Achievement Scaled Score.

*$p < .05$.

***$p < .001$.

NAME: _____
(LAST, FIRST)

Appendix A

Academic Self-Monitoring (ASM) Scale

Directions: The questions below are about things you may think about or do to help you learn in school. For each question, put a check (X) in the box under USUALLY, OFTEN, SOMETIMES, ALMOST NEVER, or NEVER. There are no right or wrong answers, so please answer each question as honestly as you can.

	USUALLY	OFTEN	SOMETIMES	ALMOST NEVER	NEVER
1. Before you begin working on an assignment, do you plan the steps you will need to follow to complete the task? Information Processing Control					
2. When your teacher is teaching a lesson, do you find that you keep daydreaming? (Item Reversed in Coding) Attention Control					
3. When your teacher is teaching a lesson, do you compare the new information to something you know about already? Information Processing Control					
4. When you do homework, do you make an outline to help you understand and remember the information? Information Processing Control					
5. When you are given information for working on an assignment, do you think it through and try to separate what is important to use from what is not important? Encoding Control					
6. While doing homework, do you work on the assignment one part at a time? Information Processing Control					
7. While doing homework, do you stop from time to time to plan the next few steps you need to take? Information Processing Control					
8. When doing assignments, do you think about whether you have a general understanding of the information? Information Processing Control					
9. When doing assignments in class, do you check your work or ask questions to make sure you understand? Information Processing Control					
10. When doing homework, do you organize the information in a way that will make it easier to remember? Information Processing Control					
11. When doing homework, do you review to help you remember it better later? Encoding Control					

THANK YOU

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NAME: _____
(LAST, FIRST)

Appendix B

Academic Action Control (AAC) Scale

Directions: The statements below are about how you handle different situations involving your schoolwork. To answer each statement, put a check (X) in the box under USUALLY, OFTEN, SOMETIMES, ALMOST NEVER, or NEVER. There are no right or wrong answers, so please answer each statement as honestly as you can.

	USUALLY	OFTEN	SOMETIMES	ALMOST NEVER	NEVER
1. When I plan to study for an important exam, I stick to my schedule. AOD Task Control					
2. When I've played an educational game and won I'm soon ready to go on to something completely different. AOP Task Control					
3. When I want to finish a long and difficult homework assignment, I tell myself to concentrate harder. AOD Self-Instruction I-C-3					
4. When I'm falling behind in my work for a course, I schedule time to catch up. AOF Task Control					
5. When I finish an assignment for one course, I begin work on another course right away. AOP Task Control					
6. When I'm successful at learning some new information, I think about something else right away. AOP Task Control					
7. When I get a bad grade on a test, I tell myself I need to work harder. AOF Self-Instruction I-C-3					
8. When I have an assignment that I know is difficult, I finish it as soon as possible. AOD Task Control					
9. If I have an exam in two weeks, I schedule times to study and stick to the schedule. AOD Task Control					
10. If I have trouble with an assignment, I tell myself I will understand it if I work hard. AOF Self-Reinforcement I-C-2					
11. When my friends try to get me to stop studying and go out with them, I tell myself I need to do my work so I can finish college. AOD Incentive Escalation I-C-1					
12. If there is a part of an assignment I really don't understand, I will usually ask my teacher for help. AOF Teacher Control					
13. When I understand a hard assignment, I congratulate myself about how well I did. AOP Self-Reinforcement I-C-2					

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Academic Action Control (AAC) Scale - continued

	USUALLY	OFTEN	SOMETIMES	ALMOST NEV	NE
14. When I'm afraid I'll lose interest and stop work on a difficult assignment, I tell myself I can do it if I try hard. AOD Self-Reinforcement I-C-2					
15. When I'm having difficulty writing a paper, I think about how important it is to finish school. AOF Incentive Escalation I-C-1					
16. When I've finished a long paper, I can't think about anything else at first. (Item Reversed in Coding) AOP Task Control					
17. When I realize an assignment is harder than I thought, I tell myself I'll have to spend more time studying it. AOF Self-Instruction I-C-3					
18. When I get a good grade on a test I didn't study for, I think about how well I did. AOP Self-Reinforcement I-C-2					
19. When I want to stop work on a homework assignment that needs to be done, I remind myself that it is important to keep up with each lesson. AOD Self-Instruction I-C-3					

THANK YOU

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NAME: _____
(LAST, FIRST)

Appendix C

Academic Self-Efficacy (ASE) Scale

Directions: The questions below ask you to describe yourself as a student. To answer each question, put a check (X) in the box under MUCH BETTER THAN AVERAGE, A LITTLE ABOVE AVERAGE, AVERAGE, A LITTLE BELOW AVERAGE, or MUCH BELOW AVERAGE. Do not worry about whether other people would agree with you. There are no right or wrong answers, so please answer each question as honestly as you can.

	MUCH BETTER THAN AVERAGE	A LITTLE ABOVE AVERAGE	AVERAGE	A LITTLE BELOW AVERAGE	MUCH BELOW AVERAGE
1. In general, how good do you think you are as a student?					
2. How good are you at writing reports, essays, etc.?					
3. How good are you at completing assignments on time?					
4. When your teacher assigns a group activity in class, how well do you participate?					
5. When an assignment is very difficult, how good are you at getting help?					
6. How well are you able to concentrate during class lectures?					
7. When you want to make a comment or ask a question in class, how good are you at explaining what you mean?					

THANK YOU

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Appendix D

Outline

Introduction to the Cognitive-Behavioral Intervention
Pretesting: 20 minutes

Environmental Monitoring and Control:

Session 1: Instruction and Practice in Environmental Control
Strategies: The Task Situation (internal and external conditions)

a. Lecturette: Objectives
b. Exercise #1: Recognizing Distractors
c. Discussion and Sharing
d. Handout #1: How to Manage Your Study Environment
e. Assignment #1: Checklist of Study Conditions
f. Summary

Session 2: Instruction and Practice in Environmental Control
Strategies: Others (peers and loved ones)
General Review and Discussion of Assignment #1

a. Lecturette: Objectives
b. Exercise #2: Role Playing - Interpersonal Response
c. Discussion and Sharing
d. Handout #2: Rules for Saying, "My education is important to me!"
e. Assignment #2: What Would You Say?
f. Summary

Monitoring and Controlling Academically-Relevent Cognitions and Motivation

Session 3: Instruction and Practice in Academic Self-Monitoring
General Review and Discussion of Assignment #2

a. Lecturette: Objectives
b. Exercise #3: Self-Monitoring During Study
c. Discussion and Sharing
d. Assignment #3: Getting the Most from your Study Time
e. Summary

Session 4: Instruction and Practice in Positive Self-Speech (Self-Coaching)
General Review and Discussion of Assignment #3

a. Lecturette: Objectives
b. Exercise #4: Positive and Negative Thoughts
c. Discussion and Sharing
d. Handout #3: Self-Coaching Statements
e. Assignment #4: Making Self-Coaching Work For You
f. Summary of Workshop: Handout #4: Summary of Good Study Habits

Posttesting: 15 minutes